COST-EFFECTIVE, MULTICHANNEL DIGITAL LOGGER

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COMPACT DISK APPENDIX

Appendix I hereto, comprising a pair of identical compact disks ("CD-Rs"), is hereby incorporated by reference. The accompanying pair of identical compact disks have the following characteristics.

Machine Format: IBM-PC

Operating System Compatibility: MS-Windows NT 4.0

List of files for directory

\Digital_Logger\Call Analyzer Source Code

File Name	Size	Creation Date
AddressDlg.cpp	9,001	07/01/03 08:07p
AddressDlg.h	1,837	04/12/00 07:09p
AddressesDlg.cpp	4,464	09/25/03 08:14a
AddressesDlg.h	1,849	09/25/03 08:13a
AdvancedPropsDlg.cpp	4,344	07/01/03 08:16p
AdvancedPropsDlg.h	1,669	07/16/01 09:55p
AnalyzeDlg.cpp	2,522	10/21/03 09:13p
AnalyzeDlg.h	1,356	10/21/03 09:13p
AnalyzeNewFileThread.cpp	4,633	08/21/03 11:13a
AnalyzeNewFileThread.h	1,495	07/01/03 08:07p
appendoptions.cpp	4,233	11/08/03 09:32p
appendoptions.h	1,388	01/28/04 08:08a
AreaCodeRecordset.cpp	2,843	02/14/01 03:29a
AreaCodeRecordset.h	1,401	03/09/00 03:40a
AUPlayer.cpp	6,870	07/01/03 08:16p
AUPlayer.h	1,642	12/25/02 10:12p
Autorun.inf	43	05/25/00 04:46p
BusinessDBDoc.h	0	02/11/01 06:01p
calendar.cpp	9,225	04/03/00 10:34p
calendar.h	3,457	02/09/99 05:29a
CaliforniaBusinessDBSet.cpp	3,026	01/21/01 07:07p
CaliforniaBusinessDBSet.h	1,944	01/21/01 07:11p
CallList.cpp	4,544	08/07/03 10:07a
CallList.h	2,038	08/08/03 03:38p
CASAnalysisParams.cpp	783	07/01/03 08:20p
CASAnalysisParams.h	1,113	11/14/01 01:19p

	File Name	Size	Creation Date	
	CASOSPropPage.cpp	8,142	08/07/03	10:10a
	CASOSPropPage.h	1,668	08/07/03	10:18a
	CASOSRecordset.cpp	3,371	07/01/03	08:20p
	CASOSRecordset.h	1,661	04/29/02	06:00a
5	CatalogFilterDlg.cpp	2,980	07/01/03	08:07p
	CatalogFilterDlg.h	1,656	11/14/01	02:25a
	cid.c	19,095	12/30/02	07:16a
	DatabasePropPage.cpp	5,753	11/06/03	11:52p
	DatabasePropPage.h	1,684	11/04/03	11:01p
10	DDC.H	1,547	10/18/94	02:09p
	DDCMATH.H	407	04/25/00	10:36p
	DialingRulesPropPage.cpp	3,370	07/01/03	08:26p
	DialingRulesPropPage.h	1,787	07/01/03	08:20p
	Dib.cpp	19,212	07/29/03	09:45p
15	Dib.h	2,384	07/29/03	09:38p
	Directories.cpp	5,548	04/22/02	01:01p
	DisplayFilterDlg.cpp	14,055	08/11/03	12:27a
	DisplayFilterDlg.h	1,895	08/07/03	10:19a
	DisplayPropPage.cpp	11,810	10/26/03	08:47p
20	DisplayPropPage.h	1,952	07/01/03	08:07p
	DLIHeaderEditDlg.cpp	14,068	09/16/03	08:18p
	DLIHeaderEditDlg.h	2,859	08/07/03	11:21a
	DLIHeaderEditForm.cpp	3,775	02/05/03	01:23p
	DLIHeaderEditForm.h	1,961	08/07/03	10:10a
25	dlilookup.cpp	1,478	12/14/01	05:30p
	dlilookup.h	1,850	12/14/01	05:30p
	DLILookup.tlh	2,497	11/15/01	04:49p
	DLILookup.tli	629	11/15/01	04:49p
	DLLC.tlh	2,553	04/10/02	07:11p
30	DLLC.tli	1,149	04/10/02	07:11p
	DLLCd.tlh	2,554	04/10/02	08:35a
	DLLCd.tli	1,149	04/10/02	08:35a
	dtpicker.cpp	9,701	02/09/99	04:18a
	dtpicker.h	3,600	02/09/99	04:18a
35	EBTreeListCtrl.cpp	3,632	08/31/03	10:22a
	EBTreeListCtrl.h	1,203	08/31/03	10:21a
	EndBtn.cpp	2,509	07/01/03	08:07p
	EndBtn.h	1,264	12/28/99	02:10a
	EQView.cpp	1,723	07/01/03	08:07p
40	EQView.h	1,587	01/09/00	04:05p
	EvidenceBuilder.clw	39,852	02/24/04	11:51a
	EvidenceBuilder.cpp	17,079	11/04/03	11:04p
	EvidenceBuilder.dsp	18,097	02/17/04	07:06a
	EvidenceBuilder.dsw	553	07/01/03	08:04p
45	EvidenceBuilder.h	1,749	09/22/03	12:44p
	EvidenceBuilder.plg	8,411	03/17/04	11:06p
	EvidenceBuilder.rc	101,300	02/24/04	11:51a
	EvidenceBuilderdoc.cpp	142,485	10/28/03	10:10p

	File Name	Size	Creation Date	
	EvidenceBuilderDoc.h	15,128	10/27/03	08:57p
	EvidenceBuilderView.cpp	259,732	03/17/04	11:37p
	EvidenceBuilderView.h	15,325	03/02/04	01:40p
	Fftmisc.cpp	1,964	12/27/99	05:08p
5	FilterDlg.cpp	13,179	07/01/03	08:00p
	font.cpp	2,098	02/09/99	05:29a
	font.h	1,042	02/09/99	05:29a
	FontPropertyPage.cpp	12,380	07/01/03	08:26p
	FontPropertyPage.h	2,017	07/01/03	08:22p
10	FontPropPage.cpp	1,139	06/28/00	04:36p
	FontPropPage.h	1,369	06/28/00	04:36p
	FOURIER.H	2,892	06/26/00	05:29p
	Fourierd.cpp	9,183	06/26/00	05:28p
	Globals.cpp	22,344	11/04/03	10:57p
15	Globals.h	10,137	11/04/03	11:04p
	HelpDoc.cpp	1,363	07/01/03	08:00p
	HelpDoc.h	1,361	07/10/00	01:37p
	HelpFrame.cpp	3,146	09/01/03	12:57p
	HelpFrame.h	1,458	09/01/03	12:57p
20	HelpView.cpp	4,737	07/01/03	08:00p
	HelpView.h	2,359	02/09/99	03:48a
	InternicPropPage.cpp	8,368	03/03/04	11:10p
	InternicPropPage.h	1,952	08/07/03	11:21a
	InternicRecordset.cpp	2,971	07/01/03	08:00p
25	InternicRecordset.h	1,553	02/12/01	07:11p
	LineCalculator.cpp	3,230	10/28/03	10:10p
	LineCalculator.h	1,286	10/27/03	08:55p
	ListViewFrame.cpp	4,253	09/01/03	07:13a
	ListViewFrame.h	2,155	08/07/03	11:31a
30	MainFrm.cpp	14,340	10/01/03	11:33a
	MainFrm.h	2,150	09/22/03	01:00p
	MakeHelp.bat	1,408	12/17/99	02:56a
	MIL_DTMF.dat	129	07/01/03	09:36a
	MIL2400ConfigDlg.cpp	29,187	07/01/03	08:00p
35	MIL2400ConfigDlg.h	3,558	05/12/03	05:20a
	MILAddressPropPage.cpp	10,588	08/08/03	09:23p
	MILAddressPropPage.h	2,022	08/07/03	10:31a
	MILAddressRecordset.cpp	4,211	09/18/03	12:48p
	MILAddressRecordset.h	1,690	02/11/01	05:59p
40	MILCatalogingException.cpp	901	07/01/03	08:00p
	MILCatalogingException.h	1,070	10/22/01	02:40a
	MILStringArray.h	606	12/27/99	05:32a
	ModelessErrorMsgDlg.h	1,366	11/08/01	06:36p
	ModelessErrorMsgDlg.cpp	1,528	08/23/00	03:26a
45	MVC3AE.tmp	12,368	02/14/01	03:36p
	NewFileMonitorThread.h	1,879	07/01/03	08:00p
	NewFileMonitorThread.cpp	11,245	08/29/03	11:51a
	NotesSearchParamsDlg.h	1,314	12/12/02	05:10p

File Name	Size	Creation Date	
NotesSearchParamsDlg.cpp	2,675	08/08/03	03:34p
ODButton.cpp	19,800	07/17/01	04:35p
ODButton.h	4,036	07/17/01	04:14p
paul_cid.dsp	4,300	04/18/00	10:45p
PauseBtn.cpp	2,447	07/01/03	08:00p
PauseBtn.h	1,279	12/28/99	02:10a
picture.cpp	1,128	02/09/99	04:18a
picture.h	1,295	02/09/99	04:18a
PlayBtn.cpp	2,283	07/01/03	08:00p
PlayBtn.h	1,271	12/28/99	02:10a
PlayBuffer.cpp	1,988	07/01/03	08:00p
PlayBuffer.h	748	12/25/02	09:43p
PlayPosSlider.cpp	1,117	07/01/03	08:00p
PlayPosSlider.h	1,274	12/28/99	10:07p
PreFilterDlg.cpp	27,524	10/09/03	03:19p
PreFilterDlg.h	2,747	09/24/03	08:54p
prefix.csv	2,904,046	07/10/00	12:37p
prefix1.csv	370,875	05/08/00	08:45p
PrefixRecordset.cpp	3,649	07/01/03	08:00p
PrefixRecordset.h	1,397	07/21/00	04:48p
PrefsDlg.cpp	11,405	07/01/03	08:22p
PrefsDlg.h	1,829	07/01/03	08:00p
PrefsPropSheet.cpp	2,784	07/01/03	08:00p
PrefsPropSheet.h	1,928	07/01/03	08:00p
PrintColHdr.cpp	1,191	07/01/03	08:00p
PrintColHdr.h	1,236	06/08/02	05:10p
RCa00772	132,904	02/14/01	06:02p
RCa77983	123,298	07/11/00	06:09p
ReadMe.txt	14,476	12/23/02	08:48a
RecordingListView.cpp	6,255	09/23/03	10:47a
RecordingListView.h	2,464	08/07/03	11:30a
resource.h	21,012	11/06/03	11:44p
SaveVersionDlg.cpp	2,133	07/01/03	08:00p
SaveVersionDlg.h	1,649	07/04/00	03:16a
SelectDriveDlg.cpp	2,404	07/01/03	08:00p
SelectDriveDlg.h	1,395	10/25/01	10:42p
SelectFolderDlg.cpp	1,301	07/01/03	08:00p
SelectFolderDlg.h	1,291	04/03/00	10:34p
SelectFolderNameDlg.cpp	1,521	07/28/03	09:37a
SelectFolderNameDlg.h	1,381	10/26/01	03:55p
SelectSearchedCallsDlg.cpp	11,321	10/02/03	09:47p
SelectSearchedCallsDlg.h	1,823	10/02/03	09:34p
SetUserFieldsDlg.cpp	2,468	07/01/03	08:00p
SetUserFieldsDlg.h	1,337	04/12/00	07:09p
Splash.cpp	3,228	07/11/00	04:18p
Splash.h	1,159	06/26/00	06:50p
StartBtn.cpp	2,535	07/01/03	08:00p
StartBtn.h	1,279	12/28/99	02:10a

File Name	Size	Creation Date
StdAfx.cpp	376	07/28/03 09:33a
StdAfx.h	3,606	10/25/03 08:46p
StepBackBtn.cpp	2,559	07/01/03 08:00p
StepBackBtn.h	1,309	12/29/99 12:22a
StepFwdBtn.cpp	2,546	07/01/03 08:00p
StepFwdBtn.h	1,299	12/29/99 12:22a
StopBtn.cpp	2,511	07/01/03 08:00p
StopBtn.h	1,271	12/28/99 02:10a
ToEndBtn.cpp	2,535	07/01/03 08:00p
ToEndBtn.h	1,246	04/29/02 06:27a
TraceDlg.cpp	996	07/01/03 08:00p
TraceDlg.h	1,297	10/31/01 03:58a
WaveformWnd.cpp	702	10/23/03 08:09p
WaveformWnd.h	1,167	10/23/03 08:23p
WBlinds.h	13,588	06/07/03 10:38a
xTurboDLL.h	1,113	08/31/03 10:26a

List of files for directory

\Digital_Logger\Call Analyzer Source Code\Help

File Name	Size	Creation Date
address_lookup.htm	3,207	05/17/02 06:46a
catalog_hard_drive.htm	3,312	06/26/03 06:49a
config_MIL-2400.htm	9,226	06/26/03 06:42a
copyCD.htm	2,078	04/20/01 03:45a
filter_calls.htm	3,403	07/14/00 11:40p
getting_started.htm	8,924	06/26/03 06:49a
help_start.htm	5,662	06/26/03 06:42a
index.htm	812	04/20/01 04:14a
notes_searching.htm	3,699	06/11/03 01:53p
page_header.htm	1,987	06/26/03 06:49a
play_call.htm	5,099	05/16/02 09:25p
prefs.htm	6,787	06/26/03 06:55a
printing.htm	5,978	05/17/02 06:42a
rollover.js	974	04/30/00 10:02p
send_files.htm	4,687	05/17/02 06:35a
sort_calls.htm	2,094	11/20/01 02:28p
troubleshooting.htm	8,291	06/26/03 06:55a

List of files for directory

\Digital_Logger\Call Analyzer Source Code\
TurboDLL_src\TurboDLL

File Name	Size	Creation Date
Affine.cpp	5,161	05/10/00 09:43p
Affine.h	3,011	05/10/00 10:31p
BitmapInfo.cpp	4,389	05/10/00 10:06p
BitmapInfo.h	1,475	05/10/00 10:31p
Color.cpp	2,916	05/10/00 10:06p
Color.h	2,776	05/10/00 10:31p
Dib.cpp	28,298	11/04/03 10:31p
Dib.h	6,451	05/11/00 10:03p
dTurboDLL.def	193	08/31/03 12:43p
filedialog.cpp	3,098	05/10/00 10:06p
filedialog.h	1,486	05/10/00 10:31p
ReadMe.txt	310	09/20/02 10:23p
resource.h	1,242	11/04/03 10:30p
StdAfx.cpp	210	12/05/01 05:19p
StdAfx.h	1,470	01/07/02 10:53a
TLCDragWnd.cpp	28,970	07/15/02 10:56p
TLCDragWnd.h	2,402	03/17/02 03:52p
TLCDropWnd.cpp	3,786	07/15/02 10:59p
TLCDropWnd.h	1,527	02/07/02 09:48p
TLHDragWnd.cpp	7,887	07/15/02 10:58p
TLHDragWnd.h	1,676	02/20/02 10:52a
TLHDropWnd.cpp	4,491	07/15/02 10:59p
TLHDropWnd.h	1,683	12/28/01 08:33p
TreeListColumnInfo.cpp	4,478	02/01/02 11:50p
TreeListColumnInfo.h	4,462	02/01/02 11:49p
TreeListComboCtrl.cpp	1,262	02/01/02 11:39p
TreeListComboCtrl.h	1,308	02/01/02 02:45a
TreeListCtrl.cpp	152,495	12/03/03 11:06p
TreeListCtrl.h	26,539	11/23/03 08:42p
TreeListDC.cpp	1,361	12/31/01 05:18p
TreeListDC.h	835	09/19/02 08:49p
TreeListEditCtrl.cpp	1,269	02/01/02 11:39p
TreeListEditCtrl.h	1,326	01/31/02 02:44p
TreeListHeaderCtrl.cpp	31,035	11/23/03 09:22p
TreeListHeaderCtrl.h	4,502	09/19/02 08:49p
TreeListItem.cpp	4,948	03/19/02 07:48p
TreeListItem.h	2,922	08/31/03 01:46p
TreeListResource.cpp	547	12/11/01 10:50a
TreeListResource.h	610	12/11/01 10:38a
TreeListStaticCtrl.h	1,481	06/20/02 08:34p
TreeListStaticCtrl.cpp	2,541	02/07/02 03:22a

File Name	Size	Creation Date
TreeListTipCtrl.cpp	10,206	03/17/02 08:03p
TreeListTipCtrl.h	2,581	01/16/02 10:10a
TurboDLL.clw	2,358	07/19/02 03:28p
TurboDLL.cpp	1,833	12/11/01 10:50a
TurboDLL.def	190	12/05/01 05:19p
TurboDLL.dep	3,673	07/16/02 10:35p
TurboDLL.dsp	8,427	11/04/03 11:11p
TurboDLL.dsw	539	12/05/01 05:21p
TurboDLL.h	201	12/11/01 10:50a
TurboDLL.mak	11,152	08/31/03 12:36p
TurboDLL.plg	3,508	09/04/03 09:14p
TurboDLL.rc	5,011	11/04/03 10:30p

List of files for directory

\Digital_Logger\Call Analyzer Source Code\
TurboDLL_src\TurboDLL\RES

File Name	Size	Creation Date
TurboDLL.rc2	400	12/05/01 05:19p

List of files for directory

\Digital_Logger\Call Analyzer Source Code\
TurboDLL_src\TurboDemo

File Name	Size	Creation Date
ReadMe.txt	3,633	09/19/02 09:11p
Resource.h	730	09/20/02 10:12p
StdAfx.cpp	211	09/19/02 09:11p
StdAfx.h	1,092	09/19/02 09:22p
TurboDemo.clw	1,414	09/20/02 10:13p
TurboDemo.cpp	2,105	09/19/02 09:11p
TurboDemo.dsp	4,677	09/20/02 09:49p
TurboDemo.dsw	541	09/19/02 09:11p
TurboDemo.h	1,357	09/19/02 09:11p
TurboDemo.plg	4,266	09/20/02 11:17p
TurboDemo.rc	5,581	09/20/02 10:12p
TurboDemoDlg.cpp	7,052	09/20/02 10:12p
TurboDemoDlg.h	1,353	09/20/02 10:11p
TurboDragDlg.cpp	9,814	09/20/02 10:15p
TurboDragDlg.h	1,363	09/20/02 10:13p

List of files for directory

\Digital_Logger\Call Analyzer Source Code\
TurboDLL_src\TurboDemo\res

File Name	Size	Creation Date
TurboDemo.rc2	401	09/19/02 09:11p

List of files for directory

\Digital_Logger\Call Analyzer Source Code\res

File Name	Size	Creation Date
EvidenceBuilder.rc2	407	07/01/03 08:07p

List of files for directory

\Digital_Logger\Main Product Source Code

File Name	Size	Creation Date
AboutDlg.cpp	454	04/13/03 07:59p
AboutDlg.h	504	04/13/03 08:08p
areafill.cpp	9,893	11/17/03 10:45p
areafill.h	2,725	11/05/03 12:43p
AudioDeviceMappingDlg.cpp	6,618	12/11/03 10:55a
AudioDeviceMappingDlg.h	1,772	06/02/03 09:22p
Buffer.h	2,959	04/23/03 07:23p
ChannelSettingsDlg.cpp	22,815	11/18/03 08:19p
ChannelSettingsDlg.h	3,325	07/14/03 09:13a
ChannelWnd.cpp	51,238	01/08/04 02:59p
ChannelWnd.h	4,734	01/07/04 01:02p
Color.cpp	2,916	05/10/00 10:06p
Color.h	2,776	05/10/00 10:31p
CxSkinButton.htm	5,585	10/27/01 09:01p
DefaultAudioDeviceSelectionDlg.cpp	2,811	01/06/04 10:19p
DefaultAudioDeviceSelectionDlg.h	1,500	01/06/04 10:08p
Defines.h	1,030	01/06/04 04:18p
DeviceList.cpp	3,889	08/12/03 05:32a
DeviceList.h	1,206	08/11/03 09:57p
devnode.c	5,834	05/30/03 08:35p
enum.cpp	53,351	06/20/03 06:01a
Globals.cpp	135	04/13/03 07:31p
Globals.h	1,286	01/07/04 09:19a

	File Name	Size	Creation Date	
	hidport.h.bak	5,041	07/26/00	10:33a
	main.cpp	767	10/29/03	08:20p
	MIL8000U.clw	6,123	01/08/04	03:00p
	MIL8000U.cpp	8,006	01/08/04	02:15p
5	MIL8000U.dsp	10,575	01/06/04	11:44p
	MIL8000U.h	1,286	07/12/03	10:27p
	MIL8000U.plg	252	01/08/04	03:18p
	MIL8000U.rc	22,330	01/08/04	03:00p
	MIL8000UDlg.cpp	14,648	01/07/04	09:04a
10	MIL8000UDlg.h	2,408	01/06/04	04:18p
	resource.h	11,552	01/06/04	09:46p
	SetupWizardIntroPage.cpp	1,260	04/16/03	07:01a
	SetupWizardIntroPage.h	1,336	04/16/03	07:05a
	SetupWizardSheet.cpp	1,072	04/16/03	07:02a
15	SetupWizardSheet.h	1,409	04/16/03	07:02a
	StdAfx.cpp	600	12/11/03	11:51a
	StdAfx.h	1,981	11/19/03	01:03p
	StereoWaveIn.cpp	2,286	04/23/03	07:28p
	StereoWaveIn.h	1,449	05/11/03	12:11p
20	ThresholdArrow.cpp	726	04/10/03	08:36p
	ThresholdArrow.h	1,202	04/10/03	08:36p
	TitleTip.cpp	4,160	11/21/02	01:17p
	TitleTip.h	985	02/04/03	08:59a
	TwoColorStatic.cpp	2,081	04/14/03	07:06a
25	TwoColorStatic.h	1,184	04/10/03	12:52p
	USBAudioPortMapper.h	1,644	11/18/03	08:08p
	USBAudioPortMapper.cpp	16,985	11/18/03	08:17p
	usbdesc.h	9,258	07/26/00	10:34a
	usbid.cpp	9,824	10/29/03	08:23p
30	usbid.dsp	4,193	10/18/03	11:21p
	usbid.dsw	533	10/17/03	10:01p
	usbid.h	229	10/29/03	08:21p
	usbid.plg	1,198	10/30/03	05:44p
	usbview.h	5,718	05/22/03	10:17p
35	VUMeter.cpp	34,126	01/07/04	12:36p
	VUMeter.h	2,537	01/07/04	09:17a
	WaveInMgr.cpp	10,933	01/07/04	01:00p
	WaveInMgr.h	1,350	04/22/03	09:33a
	WaveInThread.cpp	2,508	01/06/04	10:35p
40	WaveInThread.h	1,708	06/01/03	02:44p
	xSkinButton.cpp	25,865	04/16/03	01:05p
	xSkinButton.h	3,524	04/16/03	01:06p

List of files for directory

\Digital_Logger\Main Product Source Code\
CxSkinButton_demo

File Name	Size	Creation Date
CxSkinButtonDemo.clw	2,133	06/24/01 07:13p
CxSkinButtonDemo.cpp	1,601	03/19/01 08:06p
CxSkinButtonDemo.dsw	646	03/29/01 08:22a
CxSkinButtonDemo.dsp	6,594	06/24/01 06:41p
CxSkinButtonDemo.h	1,292	03/19/01 08:06p
CxSkinButtonDemo.rc	7,243	06/24/01 07:13p
CxSkinButtonDemoDlg.h	1,774	06/24/01 05:31p
CxSkinButtonDemoDlg.cpp	4,687	06/24/01 06:19p
resource.h	2,413	06/24/01 06:19p
StdAfx.cpp	218	03/19/01 08:06p
StdAfx.h	1,054	03/19/01 08:06p
xSkinButton.cpp	25,655	10/27/01 08:54p
xSkinButton.h	3,435	10/27/01 08:54p
xStaticText.cpp	5,826	03/31/01 07:58a
xStaticText.h	1,746	03/31/01 07:55a

List of files for directory

\Digital_Logger\Main Product Source Code\
CxSkinButton_demo\doc

File Name	Size	Creation Date
CxSkinButton.htm	5,586	10/27/01 08:58p

List of files for directory

\Digital_Logger\Main Product Source Code\
CxSkinButton_demo\res

File Name	Size	Creation Date
CxSkinButtonDemo.rc2	408	03/19/01 08:06p

List of files for directory

\Digital_Logger\Main Product Source Code\Help

File Name	Size	Creation Date
Copy of MIL-8000 Help.htm	58,397	07/12/03 09:59p
MIL-8000 Help.htm	376,146	01/08/04 03:09p

List of files for directory

\Digital_Logger\Main Product Source Code\Help\Copy of MIL-8000 Help_files

File Name	Size	Creation Date
filelist.xml	1,036	07/12/03 09:59p

List of files for directory

\Digital_Logger\Main Product Source Code\Help\Copy of images

File Name	Size	Creation Date
filelist.xml	588	07/10/03 05:31a

List of files for directory

\Digital_Logger\Main Product Source Code\Help\MIL-8000 Help_files

File Name	Size	Creation Date
filelist.xml	2,092	01/08/04 03:09p

List of files for directory

\Digital_Logger\Main Product Source Code\Help\images.bak

File Name	Size	Creation Date
filelist.xml	588	07/10/03 05:31a

List of files for directory

\Digital_Logger\Main Product Source Code\res

File Name	Size	Creation Date
MIL8000U.rc2	400	04/09/03 01:19p

List of files for directory

\Digital_Logger\T1 Logger Source Code

File Name	Size	Creation Date
ATT01413.txt	86	04/01/04 09:33a
ChannelManager.cpp	22,165	11/20/03 07:48a
ChannelManager.h	3,682	11/20/03 07:48a
ChannelModes.h	174	11/20/03 07:48a
ChannelModes.old	174	11/20/03 07:48a
Channels.cpp	12,048	11/20/03 07:48a
common.cpp	7,098	11/20/03 07:48a
ErrMsgApp.h	2,572	11/20/03 07:48a
ErrMsgApp.mc	1,956	11/20/03 07:48a
IniFile.cpp	5,356	11/20/03 07:48a
IniFile.h	1,226	11/20/03 07:48a
logger.rc	3,327	11/20/03 07:48a
Logger24.cpp	2,627	11/20/03 07:48a
Logger24.h	1,245	11/20/03 07:48a
main.cpp	5,713	11/20/03 07:48a
make_package.bat	338	11/20/03 07:48a
Message.h	2,370	11/20/03 07:48a
Purge.cpp	7,534	11/20/03 07:48a
PurgeChannel.cpp	12,898	11/20/03 07:48a
PurgeChannel.h	2,437	11/20/03 07:48a
PurgeDrive.cpp	5,675	11/20/03 07:48a
PurgeDrive.h	2,229	11/20/03 07:48a
PurgeTask.cpp	9,854	11/20/03 07:48a
PurgeTask.h	1,966	11/20/03 07:48a
SystemTask.h	636	11/20/03 07:48a
Task.cpp	2,167	11/20/03 07:48a
Task.h	1,969	11/20/03 07:48a
VuWindow.h	2,203	11/20/03 07:48a
WorkerTask.h	3,350	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\CVS

File Name	Size	Creation Date
Entries	83	11/20/03 07:48a
Repository	37	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv

File Name	Size	Creation Date
dirs	15	11/20/03 07:48a
readme.txt	1,619	11/20/03 07:48a
T1LoggerDrv.dsw	447	11/20/03 07:48a
T1LoggerDrvioctl.cpp	7,384	11/20/03 07:48a
T1LoggerDrvioctl.h	1,558	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\CVS

File Name	Size	Creation Date
Entries	401	11/20/03 07:48a
Repository	49	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\CVS

File Name	Size	Creation Date
Entries	141	11/20/03 07:48a
Repository	53	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO

File Name	Size	Creation Date
command.c51	940	11/20/03 07:48a
command.h	1,649	11/20/03 07:48a
DLSLIB.c51	2,678	11/20/03 07:48a
DLSLIB.h	701	11/20/03 07:48a
DS2152.C51	16,556	11/20/03 07:48a
DS2152.H	7,903	11/20/03 07:48a
FIFOLIB.c51	7,388	11/20/03 07:48a
FIFOLIB.h	1,420	11/20/03 07:48a
T1Logger.c51	364	11/20/03 07:48a
T1Logger.Uv2	1,848	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO\CVS

File Name	Size	Creation Date
Entries	516	11/20/03 07:48a
Repository	58	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_01

File Name	Size	Creation Date
build.bat	1,956	11/20/03 07:48a
bulkloop.c	11,296	11/20/03 07:48a
bulkloop.Uv2	2,069	11/20/03 07:48a
dscr.__i	33	11/20/03 07:48a
dscr.a51	7,222	11/20/03 07:48a
fw.c	13,513	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_01\CVS

File Name	Size	Creation Date
Entries	327	11/20/03 07:48a
Repository	61	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_TO_IBM_BTH_26

File Name	Size	Creation Date
build.bat	1,956	11/20/03 07:48a
bulkloop.c	7,630	11/20/03 07:48a
bulkloop.Uv2	2,231	03/19/04 11:26a
code.c	26,511	11/20/03 07:48a
dscr.a51	8,950	11/20/03 07:48a
fw.c	13,507	11/20/03 07:48a
mkloader.bat	73	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source

File Name	Size	Creation Date
Entries	551	11/20/03 07:48a
Repository	72	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_TO_IBM_BTH_46

File Name	Size	Creation Date
build.bat	1,956	11/20/03 07:48a
bulkloop.__i	33	11/20/03 07:48a

File Name	Size	Creation Date
bulkloop.c	10,136	11/20/03 07:48a
bulkloop.Uv2	2,068	11/20/03 07:48a
DLSLIB.__i	80	11/20/03 07:48a
dscr.__i	33	11/20/03 07:48a
dscr.a51	7,676	11/20/03 07:48a
FIFOLIB.__i	83	11/20/03 07:48a
fw.c	13,505	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source

File Name	Size	Creation Date
Entries	474	11/20/03 07:48a
Repository	72	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_TO_IBM_EP4

File Name	Size	Creation Date
build.bat	1,956	11/20/03 07:48a
bulkloop.__i	33	11/20/03 07:48a
bulkloop.c	10,134	11/20/03 07:48a
bulkloop.Uv2	2,068	11/20/03 07:48a
DLSLIB.__i	80	11/20/03 07:48a
dscr.__i	33	11/20/03 07:48a
dscr.a51	7,222	11/20/03 07:48a
FIFOLIB.__i	83	11/20/03 07:48a
fw.c	13,505	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_TO_IBM_EP4\CVS

File Name	Size	Creation Date
Entries	474	11/20/03 07:48a
Repository	69	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_TO_IBM_EP6

File Name	Size	Creation Date
build.bat	1,956	11/20/03 07:48a
bulkloop.c	13,267	11/20/03 07:48a
bulkloop.Uv2	2,068	11/20/03 07:48a
DLSLIB.__i	80	11/20/03 07:48a
dscr.__i	33	11/20/03 07:48a
dscr.a51	7,222	11/20/03 07:48a
FIFOLIB.__i	83	11/20/03 07:48a
fw.c	13,505	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\FIFO_TO_IBM_EP6\CVS

File Name	Size	Creation Date
Entries	424	11/20/03 07:48a
Repository	69	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\T1Logger

File Name	Size	Creation Date
DS2152.C51	16,554	11/20/03 07:48a
DS2152.H	7,903	11/20/03 07:48a
T1Logger.c51	1,924	11/20/03 07:48a
T1Logger.Uv2	1,697	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\FX2\T1Logger\CVS

File Name	Size	Creation Date
Entries	246	11/20/03 07:48a
Repository	62	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\SoundByChannel

File Name	Size	Creation Date
CommonDefinitions.h	1,296	11/20/03 07:48a
ReadMe.txt	1,244	11/20/03 07:48a
SoundRecoder.cpp	2,701	11/20/03 07:48a
SoundRecoder.dsp	5,096	11/20/03 07:48a
SoundRecoder.dsw	547	11/20/03 07:48a
SoundRecorderConsole.h	763	11/20/03 07:48a
SoundRecorderConsole.cpp	1,571	11/20/03 07:48a
StdAfx.cpp	299	11/20/03 07:48a
StdAfx.h	667	11/20/03 07:48a
USBAdapterOLD.cpp	3,728	11/20/03 07:48a
USBAdapterOLD.h	1,528	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\SoundByChannel\CVS

File Name	Size	Creation Date
Entries	648	11/20/03 07:48a
Repository	64	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\SoundRecoder

File Name	Size	Creation Date
CommonDefinitions.h	1,296	11/20/03 07:48a
ReadMe.txt	1,244	11/20/03 07:48a
SoundRecoder.cpp	2,704	11/20/03 07:48a
SoundRecoder.dsp	5,096	11/20/03 07:48a
SoundRecoder.dsw	547	11/20/03 07:48a
SoundRecorderConsole.h	763	11/20/03 07:48a
SoundRecorderConsole.cpp	1,910	11/20/03 07:48a
StdAfx.cpp	299	11/20/03 07:48a
StdAfx.h	667	11/20/03 07:48a
USBAdapter.cpp	2,493	11/20/03 07:48a
USBAdapter.h	1,089	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\SoundRecoder\CVS

File Name	Size	Creation Date
Entries	686	11/20/03 07:48a
Repository	62	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\exe

File Name	Size	Creation Date
CommonDefinitions.h	1,296	11/20/03 07:48a
makefile	295	11/20/03 07:48a
sources	900	11/20/03 07:48a
Test_T1LoggerDrv.cpp	5,997	11/20/03 07:48a
Test_T1LoggerDrv.dsp	8,033	11/20/03 07:48a
USBAdapter.cpp	13,324	11/20/03 07:48a
USBAdapter.h	2,829	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\exe\CVS

File Name	Size	Creation Date
Entries	369	11/20/03 07:48a
Repository	53	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\ezloader

File Name	Size	Creation Date
buildchk.log	477	11/20/03 07:48a
buildfre.log	1,464	11/20/03 07:48a
code.c	26,511	11/20/03 07:48a
ezloader.c	27,750	11/20/03 07:48a
ezloader.h	4,590	11/20/03 07:48a
ezloader.rc	2,430	11/20/03 07:48a
firmware.c	14,634	11/20/03 07:48a
loader.c	7,513	11/20/03 07:48a
Makefile	670	11/20/03 07:48a
resource.h	412	11/20/03 07:48a
Sources	1,063	11/20/03 07:48a
T1LoggerLdr.inf	3,225	11/20/03 07:48a
T1LoggerLdr.old	1,415	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\ezloader\CVS

File Name	Size	Creation Date
Entries	666	11/20/03 07:48a
Repository	58	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\ezloader\lib\CVS

File Name	Size	Creation Date
Entries	12	11/20/03 07:48a
Repository	62	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\ezloader\lib\i386\CVS

File Name	Size	Creation Date
Entries	116	11/20/03 07:48a
Repository	67	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\ezloader\lib\i386\free

File Name	Size	Creation Date
readme.txt	40	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source

File Name	Size	Creation Date
Entries	152	11/20/03 07:48a
Repository	72	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\ezloader\obj\CVS

File Name	Size	Creation Date
Entries	49	11/20/03 07:48a
Repository	62	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\sys

File Name	Size	Creation Date
buildfre.err	396	11/20/03 07:48a
buildfre.log	4,212	11/20/03 07:48a
function.h	509	11/20/03 07:48a
makefile	295	11/20/03 07:48a
makefile.inc	122	11/20/03 07:48a
msglog.h	2,585	11/20/03 07:48a
msglog.mc	1,916	11/20/03 07:48a
msglog.rc	37	11/20/03 07:48a
sources	1,208	11/20/03 07:48a
T1LoggerDrv.cpp	4,895	11/20/03 07:48a
T1LoggerDrv.dsp	27,545	11/20/03 07:48a
T1LoggerDrv.h	669	11/20/03 07:48a
T1LoggerDrv.inf	3,139	11/20/03 07:48a
T1LoggerDrv.rc	2,039	11/20/03 07:48a
T1LoggerDrvDevice.cpp	46,521	11/20/03 07:48a
T1LoggerDrvDevice.h	3,375	11/20/03 07:48a
TransferingQueue.h	4,395	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\sys\CVS

File Name	Size	Creation Date
Entries	999	11/20/03 07:48a
Repository	53	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\sys\obj\CVS

File Name	Size	Creation Date
Entries	53	11/20/03 07:48a
Repository	57	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\sys\objchk\CVS

File Name	Size	Creation Date
Entries	12	11/20/03 07:48a
Repository	60	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\sys\objchk\i386\CVS

File Name	Size	Creation Date
Entries	55	11/20/03 07:48a
Repository	65	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\sys\objfre\CVS

File Name	Size	Creation Date
Entries	12	11/20/03 07:48a
Repository	60	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\T1LoggerDrv\sys\objfre\i386\CVS

File Name	Size	Creation Date
Entries	55	11/20/03 07:48a
Repository	65	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\USB2T1

File Name	Size	Creation Date
attantion.txt	176	11/20/03 07:48a
ChannelLevelAdapter.cpp	11,942	11/20/03 07:48a
ChannelLevelAdapter.h	3,010	11/20/03 07:48a
CLSID_USB2T1.CPP	240	11/20/03 07:48a
CLSID_USB2T1.H	154	11/20/03 07:48a
CommonDefinitions.h	161	11/20/03 07:48a
IAudioLoggerAdapterImplementation.cpp	6,261	11/20/03 07:48a
InterfaceDefinition.h	414	11/20/03 07:48a
InterfaceIncludes.h	190	11/20/03 07:48a
REDEBUG.BAT	30	11/20/03 07:48a
reg.BAT	22	11/20/03 07:48a
RERELEAS.BAT	33	11/20/03 07:48a
SearchInterfaceMacros.h	137	11/20/03 07:48a
Server.cpp	1,439	11/20/03 07:48a
T1LevelAdapter.cpp	20,362	11/20/03 07:48a
T1LevelAdapter.h	3,323	11/20/03 07:48a
USB2T1.cpp	6,015	11/20/03 07:48a
USB2T1.DEF	264	11/20/03 07:48a
USB2T1.dsp	6,973	11/20/03 07:48a
USB2T1.dsw	1,355	11/20/03 07:48a
USB2T1.h	1,938	11/20/03 07:48a
USB2T1_Const.h	494	11/20/03 07:48a
USB2T1Config.cpp	11,836	11/20/03 07:48a
USB2T1Config.h	3,932	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\USB2T1\CVS

File Name	Size	Creation Date
Entries	1,298	11/20/03 07:48a
Repository	44	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\USB2T1\
GenSignPattern

File Name	Size	Creation Date
GenSignPattern.cpp	2,203	11/20/03 07:48a
GenSignPattern.dsp	4,632	11/20/03 07:48a
GenSignPattern.dsw	551	11/20/03 07:48a
ReadMe.txt	1,256	11/20/03 07:48a
StdAfx.cpp	301	11/20/03 07:48a
StdAfx.h	667	11/20/03 07:48a

List of files for directory

\Digital_Logger\T1 Logger Source Code\USB2T1\
GenSignPattern\CVS

File Name	Size	Creation Date
Entries	289	11/20/03 07:48a
Repository	59	11/20/03 07:48a
Root	48	11/20/03 07:48a

List of files for directory

\Digital_Logger\USB Device Identifier Source Code

File Name	Size	Creation Date
main.cpp	767	10/29/03 08:20p
usbid.cpp	9,824	10/29/03 08:23p
usbid.dsp	4,193	10/18/03 11:21p
usbid.dsw	533	10/17/03 10:01p

File Name	Size	Creation Date
usbid.h	229	10/29/03 08:21p
usbid.plg	1,198	10/30/03 05:44p

List of files for directory

\Digital_Logger\Utilities and Libraries

File Name	Size	Creation Date
AUHeader.h	15,870	10/06/03 07:26a
BrowseForFolder.cpp	4,161	05/19/98 09:00p
BrowseForFolder.h	5,602	05/02/03 01:25p
CancelException.h	156	04/17/02 07:35a
ComboInListView.cpp	3,224	12/03/02 06:01a
ComboInListView.h	1,611	12/22/98 01:18p
Copy of Folder.cpp	22,974	08/28/03 11:47a
Copy of Folder.h	7,481	08/28/03 11:35a
DelayedDirectoryChangeHandler.h	4,948	11/24/01 04:18p
DelayedDirectoryChangeHandler.cpp	10,720	05/14/02 07:46p
DeletionThread.cpp	6,677	08/06/03 05:20a
DeletionThread.h	2,553	05/02/02 07:00p
DirectoryChanges.cpp	48,153	09/16/02 10:46a
DirectoryChanges.h	11,216	09/16/02 10:19a
FilterParams.cpp	5,766	10/13/03 08:34p
FilterParams.h	2,581	10/13/03 08:29p
Folder.cpp	21,302	11/04/03 09:07p
Folder.h	5,571	10/15/03 12:27p
FolderArray.h	617	05/15/02 07:41p
IMapi.cpp	5,883	02/03/99 02:37p
IMapi.h	1,217	10/06/98 01:46p
listeditctrl.cpp	3,413	12/03/02 06:01a
listeditctrl.h	1,496	12/22/98 01:18p
ListViewFrame.cpp	4,207	05/15/02 06:53p
Log.cpp	1,408	01/30/04 10:55a
Log.h	1,175	01/30/04 07:22a
MIL2400INIFile.cpp	35,036	07/14/03 08:59a
MIL2400INIFile.h	3,204	07/14/03 08:59a
MILAddress.cpp	1,598	09/08/03 01:36a
MILAddress.h	954	09/08/03 01:36a
MILDateTime.cpp	821	09/08/03 10:08a
MILDateTime.h	1,145	09/08/03 09:01a
NewHeaderCtrl.cpp	8,471	03/12/02 08:40p
NewHeaderCtrl.h	3,028	03/12/02 08:40p
PlayerBuffer.h	6,660	01/08/02 10:18a
RCa01324	6,958	02/13/03 09:14p
Readme.txt	1,461	05/02/02 06:30p
Recording.cpp	88,098	01/31/04 02:46p

File Name	Size	Creation Date
Recording.h	15,041	01/12/04 08:34a
Recording.h.bak	11,409	08/05/03 03:32p
registry.cpp	16,158	06/09/03 05:34a
registry.h	2,227	06/09/03 05:34a
resource.h	780	10/08/03 06:29a
SampleSpecs.h	547	01/19/99 04:45p
SBDestination.cpp	1,132	04/25/98 09:22a
SBDestination.h	910	05/02/02 07:00p
StdAfx.cpp	205	05/02/02 06:30p
StdAfx.h	873	08/08/03 07:24a
supergridctrl.cpp	63,319	12/03/02 05:52a
supergridctrl.h	16,811	12/03/02 05:49a
TreeListCtrl.cpp	24,936	08/27/03 07:33a
UtilFunctions.cpp	73,795	01/28/04 08:23a
UtilFunctions.h	8,072	01/28/04 08:23a
UtilLib.dsp	9,883	01/13/04 10:55p
UtilLib.plg	249	06/09/03 05:13a
UtilLib.rc	5,044	02/14/03 09:50a
UtilLib.stc	43	09/13/02 09:20a
UtilLib.stt	43	08/05/02 07:05a
WaveIn.cpp	15,265	01/07/04 12:39p
WaveIn.h	1,921	07/01/03 03:09p
WaveOut.cpp	1,411	08/05/03 09:12p
WaveOut.h	1,271	08/05/03 09:09p
xSkinButton.cpp	25,655	10/27/01 08:54p
xSkinButton.h	3,435	10/27/01 08:54p

List of files for directory

\Digital_Logger\Utilities and Libraries\res

File Name	Size	Creation Date
UtilLib.rc2	399	02/14/03 09:50a

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BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to data recording, and more particularly to systems for recording voice communications as compressed digital data.

Description of the Prior Art

United States Patent no. 6,122,239 ("the '239 patent") entitled "Pre-Mastering, Archival Optical Recorder That Provides Extended Recording Time" discloses both a pre-mastering, optical recorder and a logging workstation which both receive and condition an analog signal. Both the recorder and the workstation, sometimes referred to as digital loggers, then digitize the conditioned signal storing the digitized data thus obtained in a buffer, preferably either a large RAM or a hard disk. When the digitized data occupies more than a pre-established fraction of the buffer, both the recorder and the workstation further compress the data to recover buffer space thereby permitting recording to continue. The recorder also pre-masters the data for recording onto optical-recording media using an optical-disk recorder included in the

digital logger. Instead of an optical-disk recorder, the workstation includes a network interface circuit that interfaces the workstation with a network thereby permitting the logger to transmit digital audio data via the network for recording either to a pre-mastering, optical recorder, or to a digital logger recorder.

Presently, a variety of systems exist, analogous to that described in the '239 patent, for concurrently recording several audio signals from various sources including telephone and radio signals. Usually such systems are a self-contained and include:

1. a dedicated microprocessor which operates as a local storage controller; and
2. a Digital Signal Processing ("DSP") co-processor, usually connected via a Peripheral Component Interface ("PCI") bus, to the dedicated microprocessor.

Systems of this type exhibit decided disadvantages which include complexity, cost, and difficulty in configuration.

BRIEF SUMMARY OF THE INVENTION

An object of the present invention is to provide a lower-cost multi-channel digital logger system.

Another object of the present invention is to provide a simpler multi-channel digital logger system.

Another object of the present invention is to provide a more cost-effective multi-channel digital logger system.

Another object of the present invention is to provide a multi-channel digital logger system that is simpler to manufacture.

Another object of the present invention is to provide a multi-channel digital logger system that is easier to configure.

Another object of the present invention is to provide a multi-channel digital logger system that is economical to manufacture.

Another object of the present invention is to provide a digital logger system which includes a linear CODEC for digitizing audio data, the digital audio data being subsequently converted by a software computer program of digital logger system into μLaw compressed digital audio data before recording the compressed digital audio data.

Another object of the present invention is to provide a digital logger system that augments information about a recorded telephone call with additional information autonomously retrieved from publicly accessible databases.

Briefly, the present invention in one embodiment is a digital logger system adapted for receiving and recording audio telecommunication signals. The digital logger system includes a multichannel interface circuit adapted:

1. for concurrently and continuously receiving audio telecommunication signals for at least two telephone calls; and

2. for continuously transmitting digital audio data extracted from the received audio telecommunication signals.

The digital logger system also includes a Universal Serial Bus ("USB") hub:

1. for receiving the digital audio data continuously transmitted from the multichannel interface circuit; and
2. for transmitting the digital audio data to a USB root hub.

Lastly, the digital logger system includes a personal computer ("PC") having a USB root hub that is coupled to the USB hub. The PC receives the digital audio data transmitted from the USB hub, and executes PC software. The PC software continuously monitors the received digital audio data for decoding line status and signaling information embedded in digital audio data to determine status of a telephone line including a telephone line "going off hook." Upon detecting a telephone line "going off hook," the PC software records both:

1. an audio header that stores information about a telephone call; and
2. an audio file that stores compressed digital audio data for the telephone call.

In another embodiment the present invention is an improved digital logger system adapted for receiving and recording audio

telecommunication signals. The digital logger system including a PC which executes PC software that:

1. monitors digital audio data of audio telecommunication signals for line status and signaling information embedded in digital audio data to determine status of a telephone line including a telephone line "going off hook;" and
2. upon detecting a telephone line "going off hook," records both:
    a. an audio header that stores information about a telephone call; and
    b. an audio file that stores compressed digital audio data for the telephone call.

This embodiment of the present invention also includes a search engine which, upon decoding appropriate signaling information for a telephone call, initiates a real-time reverse-lookup that accesses publicly accessible directories and business information.

These and other features, objects and advantages will be understood or apparent to those of ordinary skill in the art from the following detailed description of the preferred embodiment as illustrated in the various drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective diagram illustrating a digital logger system of the present invention that includes a PC and an eight (8) channel signal processor in accordance with a preferred embodiment of the present invention, and that also usually includes both a display and a keyboard;

FIG. 2 is a mixed schematic and block diagram for the eight (8) channel multichannel interface circuit, included in the signal processor depicted in FIG. 1, that receives analog audio communication signals from telephone trunk lines and generates digital audio data for transmission to the PC;

FIG. 3 is a flow diagram depicting processing performed on digital audio data received from the eight (8) channel signal processor by software executed by the PC;

FIG. 4 is an alternative embodiment of the flow diagram of FIG. 3 which further includes a search engine that autonomously searches Internet Web sites in real-time for information pertinent to audio data then being processed within the PC; and

FIG. 5 is a mixed schematic and block diagram for an alternative embodiment of the multichannel interface circuit depicted in FIG. 2 that receives audio communication signals from a digital hybrid telephone T1 line and generates digital audio data for transmission to the PC.

DETAILED DESCRIPTION

The perspective diagram of FIG. 1 depicts a digital logger system in accordance with the present invention referred to by the general reference character 10. The digital logger system 10 includes a PC 12 having a USB root hub, not depicted in any of the FIGs, to which a USB cable 14 connects an eight (8) channel signal processor 16. In most instances, the digital logger system 10 also includes both a display 22 connected to the PC 12 by a display cable 24, and a keyboard 26 connected to the PC 12 by a keyboard cable 28. Although the USB cable 14 may supply electrical power for energizing the operation of some devices connected to the PC 12 thereby, a preferred embodiment of the signal processor 16 also includes an external 5 volt power supply that is not illustrated in any of the FIGs. Other items not illustrated in FIG. 1 which may also be included in the digital logger system 10 are a mouse, track ball or joy stick, and also audio speakers for listening to communications recorded by the digital logger system 10.

In a presently preferred embodiment, the signal processor 16 includes eight (8) outside-analog-trunk receptacles 32. The outside-analog-trunk receptacles 32 are adapted to receive plugs of individual telephone cables that connect the signal processor 16 to analog telephone trunk lines. This embodiment of the signal processor 16 also includes eight (8) telephone receptacles 36. The telephone receptacles 36 are adapted to receive plugs of individual

telephone cables that connect the signal processor 16 either to a handset, to a PBX, or to a telephone. For this particular embodiment of the signal processor 16, the outside-analog-trunk receptacles 32 and the telephone receptacles 36 are adapted to receive a type RJ12 plug.

As illustrated in FIG. 2, within the signal processor 16 each of the outside-analog-trunk receptacles 32 connects to one of the telephone receptacles 36. In this way the signal processor 16 couples analog audio communication signals between each telephone trunk line, i.e. through one outside-analog-trunk receptacle 32 and the telephone receptacle 36 connected thereto, and a handset, a PBX, or a telephone.

The signal processor 16 includes four (4) identical multichannel interface circuits 42, each of which is respectively enclosed within a dashed line in the illustration of FIG. 2. Each multichannel interface circuit 42 equips the signal processor 16 with a pair of simple line interfaces. Each line interface respectively receives and electronically conditions an analog audio communication signal from one of the outside-analog-trunk receptacles 32. Each line interface includes a series connected capacitor 44 and first winding of a transformer 46 that are connected in series across the outside-analog-trunk receptacle 32. A second winding of the transformer 46 connects to a surge protection circuit which includes a capacitor 52 that connects across the second winding to

circuit ground in parallel with two oppositely oriented, series connected, pairs of 1N4007 diodes 54. The capacitively coupled transformer 46 and the surge protection circuit provides AC line coupling which is compatible with both "wet" and "dry" telephone trunk lines. This configuration for the transformer 46 and the surge protection circuit allows each multichannel interface circuit 42 to continuously and passively monitor a pair of telephone trunk lines without "going off hook," i.e. without presenting low impedance to either telephone trunk line connected respectively to the outside-analog-trunk receptacles 32.

Furthermore, the transformer 46 and capacitor 44 provide bi-directional coupling which enables the multichannel interface circuit 42 to independently inject audio signals back into each of the telephone trunk lines without "going off hook." The ability to inject an audio signal back into a trunk line permits automatically presenting a caller with audible announcements such as "this call may be monitored or recorded for quality assurance."

Those skilled in the art will appreciate that an audio signal may also be received from each outside-analog-trunk receptacle 32 into the multichannel interface circuit 42 using a high-impedance operational amplifier instead of the transformer 46. However, use of a high-impedance operational amplifier provides only unidirectional coupling of an analog signal from a telephone trunk line,

and therefore prevents injecting an audio signal back into the line as described above.

In addition to the surge protection circuit, each channel of the multichannel interface circuit 42 includes a series connected capacitor 56 and potentiometer 58 also connected across the second winding of the transformer 46. A series connected resistor 62 and capacitor 64 couple an analog signal from an adjustable center terminal of the potentiometer 58 to an inverting input terminal of an amplifier 66. The amplifier 66 is preferably a model MC34072 manufactured by Motorola, Inc. or by Unisonic Technologies Co., Ltd. A gain control feedback resistor 68 also connects between the inverting input terminal of the amplifier 66 and an output terminal of the amplifier 66. The strength of the analog audio signal supplied from each potentiometer 58 to the amplifier 66 may be adjusted by rotating a control knob 69, depicted in FIG. 1, that is coupled to the potentiometer 58. A label 71, adjacent to each control knob 69, identifies the channel for which the control knob 69 adjusts the analog audio signal's strength.

A non-inverting input terminal of each amplifier 66 is coupled through a capacitor 72 to circuit ground, and connects directly to a VCCM terminal 73 of a model PCM2904DB "Stereo Analog CODEC With USB Interface" 74 that is manufactured by Texas Instruments Incorporated. The preferred embodiment of the signal processor 16 uses this lower-cost, linear Pulse Code Modulation ("PCM") model

PCM2904DB stereo CODEC 74 instead of a more expensive logarithmic telecom CODEC such as that disclosed in the '239 patent. Use of such a commercial, off-the-shelf CODEC significantly betters the cost-effectiveness of the signal processor 16 in comparison with a digital logger of the type disclosed in the '239 patent. An output terminal 76 of the pair of amplifiers 66 in each multichannel interface circuit 42 connects respectively either to an ADC analog input for a R-channel $V_{IN}R$ terminal 78R or a L-channel $V_{IN}L$ terminal 78L of the stereo CODEC 74. As illustrated in FIG. 2, the single stereo CODEC 74 included in each multichannel interface circuit 42 simultaneously converts two monaural channels of audio communication signals respectively received through each of the outside-analog-trunk receptacles 32 into digital audio data while preserving adequate separation in that data between the two analog signals.

The stereo CODEC 74 transmits from its USB differential input/output minus terminal 82m and its USB differential plus terminal 82p audio data digitized from the two channels of audio signals received by the outside-analog-trunk receptacles 32 included in each multichannel interface circuit 42. The pair of differential signals transmitted from the input/output terminals 82m and 82p of the stereo CODEC 74 included in each four (4) multichannel interface circuit 42 are respectively supplied to pairs of USB upstream differential minus and plus data terminals

86m and 86p of a TUSB2046BFV 4-port USB hub 88 that is manufactured by Texas Instruments Incorporated. Root port USB downstream differential minus and plus data terminals 92m and 92p of the USB hub 88 are coupled to the USB cable 14 via a USB "B" receptacle 94. Also connected to the USB hub 88 is a USB configuration data EEPROM 98 which stores a vendor ID ("VID") and a product ID ("PID") for the signal processor 16. Use of the USB hub 88 is vital to the digital logger system 10 because it establishes within the digital logger system 10 a USB "Composite Device" that reduces the cost of the digital logger system 10, and allows all four (4) multichannel interface circuits 42 together with the USB hub 88 to be assembled on a single printed circuit board (PCB) using proper mixed-signal design rules.

As depicted in FIG. 2, analog outputs for right channel 102R and for left channel 102L of the stereo CODEC 74 of each multichannel interface circuit 42 are respectively coupled by a series connected resistor 104 and capacitor 106 to the second windings of each transformer 46 thereof. Digital audio data appropriately supplied to the stereo CODEC 74 via the USB hub 88 produces an analog output signal that is coupled through the transformer 46 to the outside-analog-trunk receptacle 32 thereby permitting the signal processor 16 to transmit audible announcements to callers.

Texas Instruments model PCM2904DB stereo CODECs 74 are preferred for the multichannel interface circuit 42 because they

comply with the "Human Interface Driver" ("HID") specification. For computers running either LINUX or particular Microsoft operating systems such as Windows 98 and 2000, the HID standard specifies a software interface which permits an application computer program running in the PC 12 to communicate with the signal processor 16 via the USB cable 14. Consequently, a combination of the preferred stereo CODECs 74, the USB hub 88, the USB cable 14 and an operating system running in the PC 12 which provides HID functionality avoids both any need to write a device driver specifically for the signal processor 16, and the installation of special device driver software in the PC 12 of every digital logger system 10. Instead, application software exchanges data between the digital logger system 10 and the signal processor 16 using the operating system's native HID 112 illustrated in FIG. 3.

In general, HID-class devices include those controlled by humans for operating a computer system. Typical examples of HID-class devices that can communicate with a PC via a USB in conjunction with the HID 112 include keyboards, mice, trackballs, joysticks, disk drives, printers, and scanners. The HID 112 is general, and primarily handles the USB functionality of the device and generic HID functionality. The HID-class specification is the product of a working group sponsored by the USB Implementers Forum (www.usb.org).

When a device is plugged into the USB or when a host PC is turned on with a device attached to the USB, an operating system that includes a HID 112 running in the PC retrieves a series of descriptors from each USB device during a process called enumeration. After enumeration, the HID 112 provides an interrupt pipe for the device to send data packets, and the HID 112 opens the pipe to the interrupt endpoint and starts polling. The HID 112 is also responsible for managing the device through the default control pipe. HID devices dynamically describe their packets and other parameters through a HID report descriptor. The HID parser is a miscellaneous module that parses the HID report descriptor and creates a database of information about the device.

Major features and limitations of a HID 112 are:

1. a full-speed HID 112 can transfer up to 64,000 bytes per second (64 bytes in each 1ms frame);
2. a HID 112 can request that the PC poll the device periodically to find out if the device has data to send; and
3. all data exchanged by a HID 112 resides in defined data structures called reports.

A single report can contain up to 65,535 bytes. The device's firmware must include a report descriptor that describes the data being exchanged. The report format for a HID 112 is flexible enough to handle almost any type of data.

Due to its generality, a HID 112 may also be used in conjunction with the USB for communicating with devices such as the signal processor 16, that do not really involve a human interface, but which exhibit communication requirements similar to those of human interface devices. The HID 112 handles any such device (actually the interface with such a device) that claims to comply with the HID specification.

Description of Software

A computer program executed by the PC 12 is also vital to the digital logger system 10. Ever increasing computational capabilities of PCs presently enables a single PC to receive multiple channels of digital audio data via its USB while software running on the PC concurrently:

1. decodes communication signals embedded in digital audio data received from the signal processor 16;
2. compresses the digital audio data; and
3. stores the compressed digital audio data onto a recording device such as a hard disk.

Appendix I provides a source code program listing for computer programs included in an implementation of the present invention. The computer program is written in the C++ programming language that is well-known to those skilled in the art. The program has been executed on a Dell P4 PC. It is readily apparent to those

skilled in the art that various other programming languages and/or digital computers could be used for alternative, equivalent implementations of the invention.

For Microsoft's Windows operating systems, a low-level software interface connects to audio primitives of the HID 112. For the LINUX operating system, the low-level interface ports to the HID 112 through a block-and-character driver. Packets of digital audio data for each of the eight channels received from the signal processor 16 are stored in local system memory and passed to the higher level portions of the application program using individual ring buffers included in audio data buffers 114. The ring buffers of the audio data buffers 114 cache the audio data stream during periods in which the operating system is occupied with higher priority tasks, and therefore is unable to allocate adequate resources to process digital audio data in real-time.

A signaling detector 115 also receives packets of digital audio data for each of the eight channels of digital audio data received from the signal processor 16. Whenever in checking packets of digital audio data the signaling detector 115 determines that a signaling event is occurring, it transmits a control signal to a fast fourier transform ("FFT") routine 116 which activates the FFT routine 116 for processing packets of digital audio data.

Whenever processing resources of the PC 12 become available, the FFT routine 116 performs a Discrete Fourier Transform ("DFT")

on packets of incoming audio digital audio data both individually and in small groups. The FFT routine 116 passes the spectrum versus time matrix which it produces to a spectral averager 118.

For each channel of digital audio data received from the signal processor 16, the spectral averager 118 accumulates spectral data received from the FFT routine 116 to detect spectral peaks which exceed preset threshold values. The spectral values are stored in tables and vary significantly depending on the period of the incoming signaling. When peaks in the spectral data exceed threshold values corresponding to an anticipated spectral distribution of incoming signaling, the spectral averager 118 increments a counter which accumulates data for the channel on which the peak occurred. Periodically, these counters are decremented or zeroed. Detection of a signaling event occurs, e.g. "going off hook," dial tone, ringing, a particular touch-tone key is being pressed, etc., when values in counters exceed specified thresholds.

As described previously, the signal processor 16 supplies digital audio data continuously for each of its eight (8) channels even when no telephone call is occurring. To record digital audio data only during a telephone call, a telco tone decode routine 124 processes output from the spectral averager 118 to detect and decode various different types telephone signaling such as ringing, Dual-Tone Multifrequency ("DTMF") signaling, Automatic Number Identification ("ANI") also known as Caller-ID ("CID"), or

Automatic Location Identification ("ALI"). The decode routine 124 also includes a deserializer, which operates analogous to a hardware shift-register, for converting a serialized stream of decoded telephone signals into parallel bytes for further processing by an application program 126. In addition, the deserializer also performs parity detection and correction when ANI/CID or ALI signaling occurs.

The application program 126 includes an audio header composer which receives telephone signaling data decoded by the decode routine 124. Information about each telephone call is stored in an audio header portion 132 at the beginning of an audio file 134. Data stored in the audio header portion 132 include the channel of the signal processor 16 from which the data was recorded; the date, time and time zone of the recording; the name assigned to the PC 12; the model and serial numbers of the signal processor 16 and the type of stereo CODEC 74 included in the signal processor 16; whether data in the audio file 134 has been analyzed for DTMF or CID signaling; the direction of the telephone call either incoming or outgoing; and the telephone number specified by DTMF or CID signaling. The audio header portion 132 makes each recorded telephone call a self-contained repository both for the recorded digital audio data, and for the information about the calling party which was obtained while recording the digital audio data.

The application program 126 also stores digital audio data for each recorded telephone call, compressed as described in the '239 patent, into an audio data portion 136 of a separate, time-stamped audio file 134. Pointers to various locations within each ring buffer in the audio data buffers 114 ensure temporal synchronization between the arrival at the application program 126 of parallel bytes of decoded telephone signals extracted from the digital audio data of a particular channel by the decode routine 124 and compression of that channel's digital audio data by the application program 126. However, since the a model PCM2904DB stereo CODEC 74 produces linear PCM digital audio data rather than μLaw compressed digital audio data such as that produced by more expensive telecom CODECs, before performing software compression using table lookup the application program 126 of the present invention first converts the linear PCM digital audio data into μLaw compressed digital audio data. The '239 patent is hereby incorporated by reference as though fully set forth here.

When a telephone line initially "goes off hook," the application program 126 allocates a "temporary" header array in RAM which stores as much information as is initially available when the call commences. This header array contains sufficient information that an audio playback program can reproduce compressed digital audio data even though the telephone call is incomplete. Thereafter, the application program 126 opens the audio file 134 for recording both

the audio header portion 132 and the audio data portion 136. In opening the audio file 134, the application program 126 stores the "temporary" header at the beginning of the audio file 134. A pointer at the beginning of the audio header portion 132 specifies where the audio data portion 136 begins in the audio file 134. Thereafter, as the application program 126 prepares compressed digital audio data it is written into the audio data portion 136 of the audio file 134. Writing the compressed digital audio data into the audio data portion 136 immediately permits reproducing the telephone call in "real time" while it is being logged. While compressed digital audio data is being recorded into the audio data portion 136, gradually over time the application program 126 updates the audio header portion 132 with the DTMF data, CID and other information. After the call is completed, the application program 126 stores the last of the information, e.g. call length, etc., into the audio header portion 132. Thus at the end of each telephone call, the single audio file 134 contains a complete audio header portion 132 and all the compressed digital audio data in the audio data portion 136 for a single telephone call.

When appropriate for transmitting an audible announcement to a caller, the application program 126 also transmits digital audio data to announcement buffers 138 for transmission via the HID 112 to the appropriate stereo CODEC 74 in the signal processor 16. For example, following ring detection and a telephone line "going off

hook," the application program 126 might transmit digital audio data to the announcement buffers 138 which, via a specified channel of the signal processor 16, presents the caller with an audible announcement such as "this call may be monitored or recorded for quality assurance."

An alternative embodiment of the present invention illustrated in FIG. 4 augments the application program 126 with a search engine 142. When DTMF, CID or ALI signals occur, the application program 126 passes that data to the search engine 142 which initiates, via the Internet 144, a real-time reverse-lookup. Using the street address or caller's telephone number, the search engine 142 issues Internet Hypertext Transfer Protocol ("HTTP") requests to search publicly accessible Internet directories for business data. If the search engine 142 receives a CID telephone number, the address and name of the calling party may be determined via a reverse-lookup of the number in published directories. In addition, the telephone number is matched against search-engine responses, and these responses are traced to generate business information, such as the Standard Industrial Codes ("SIC") and other general information about the caller. The search engine 142 then passes the information obtained from these searches to the audio header composer of the application program 126 for storage in the audio header portion 132.

A higher level user-interface, not illustrated in any of the FIGs., may then allow the user to quickly index audio files 134 based on information stored in audio header portions 132. This information is searchable and reports can be generated using information stored about selected calls. For example, it becomes easy to generate a list of calls which have originated from IBM Corporation, since the main IBM telephone number appears in the CID stream, and the search engine 142 uses that number to reverse-index an address. Another example is the ability to locate calls originating from a particular street address, if that address is accessible via the Internet 144 along with the related telephone number. It is readily apparent that the usefulness of the search engine 142 in obtaining information from callers which have blocked CID is limited, but a significant amount of business information may be accessed via the Internet 144 for businesses which do not have publicly listed telephone numbers. This information can then be used to index and sort audio files 134 which might otherwise be of limited use.

If information obtained by the search engine 142 is to be provided in real-time to someone who is answering a telephone call, then in addition to storage in the audio header portion 132, the information must be communicated via a network to a workstation that is visible to the person answering the telephone call.

While the accuracy currently available with speech-to-text software is limited, eventually it should be possible to generate audio file headers which contain a text which accurately presents the spoken words in audio files 134. This capability has been demonstrated using the publicly available SPHYNX software. Presently, the accuracy of the speech-to-text is limited by the available processing power of the PC 12. As processing power of PCs 12 increase, it is apparent that accuracy will increase and true "speaker independent" voice recognition with larger vocabularies will become practical.

Although the present invention has been described in terms of the presently preferred embodiment, it is to be understood that such disclosure is purely illustrative and is not to be interpreted as limiting. For example, if audio communication signals are supplied to the signal processor 16 via a T1 line, then as illustrated in FIG. 5 preferably a Dallas Semiconductor DS3152 Framer 162 coupled to a Cypress Semiconductor E Z-USB FX2™ USB Microcontroller High-speed Peripheral Controller 164 by a bus 166 replace the stereo CODECs 74 and their associated components. Those elements of the alternative embodiment of the present invention depicted in FIG. 5 that are common to the multichannel interface circuit 42 illustrated in FIG. 2 carry the same reference numeral distinguished by a prime ("'") designation. For such a configuration of the multichannel interface circuit 42', the Framer

162 rather than the stereo CODEC 74 interfaces the T1 telephone line at the physical layer to thereby receive the audio communication signal directly from the transformer 46. The Peripheral Controller 164 exchanges digital audio data with the Framer 162 and provides a HID compatible interface between the Framer 162 and the USB hub 88'. Note that because the digital audio data received from the T1 telephone line by the Framer 162 has already undergone μLaw compression, when the multichannel interface circuit 42' connects to a T1 telephone line the application program 126' does not perform μLaw compression. Note also that the accuracy of speech-to-text conversion can be improved if the signal processor 16 is connected to a true-digital hybrid telephone line such as a T1 line.

Consequently, without departing from the spirit and scope of the invention, various alterations, modifications, and/or alternative applications of the invention will, no doubt, be suggested to those skilled in the art after having read the preceding disclosure. Accordingly, it is intended that the following claims be interpreted as encompassing all alterations, modifications, or alternative applications as fall within the true spirit and scope of the invention.